Hitachi Power Tools

TECHNICAL DATA AND SERVICE MANUAL

LIST No.
WP 14DSL: H846
Oct. 2009

PRODUCT NAME

Hitachi 14.4 V Cordless Oil Pulse Driver
Model WP 14DSL

MARKETING OBJECTIVE

The new Model WP 14DSL Cordless Oil Pulse Driver is equipped with a 14.4 V lithium-ion battery. Features of the Model WP 14DSL include the following:

(1) Lightweight and compact
(2) Highest tightening speed and capacity in its class
(3) Quiet: 75 dB (Equipped with the oil pulse unit)
(4) Switchable impact rate between two modes (save mode and power mode)

With the new Model WP 14DSL, we intend to expand our market share.

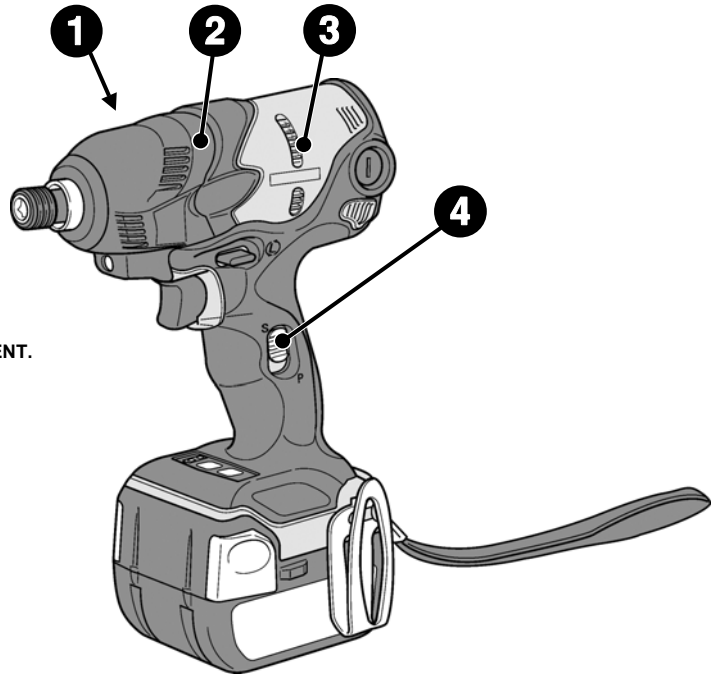
APPLICATIONS

- Tightening and loosening of small screws, tapping screws, wood screws, Teks screws, Hex screws, etc.
- Tightening and loosening of bolts are not available due to possible trouble.

SELLING POINTS

[NEW FEATURES]

1. **Lightweight and compact**
2. **Highest tightening speed and capacity in its class**
3. **Quiet: 75 dB**
4. **With a 2-stage switching function (rotational speed and number of impacts)**



SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT.

HITACHI

Hitachi Koki Co., Ltd.
International Sales Division

W

REMARKS:

• For more information about HANDLING INSTRUCTIONS, visit our website at:

http://www.hitachi-koki.com/manual_view_export/

• This TECHNICAL DATA AND SERVICE MANUAL utilizes symbols to denote the company and model names of our competitors. The symbols utilized herein are as follows:

Symbols utilized	Competitors	
	Company name	Model name
M	MAKITA	BTS130

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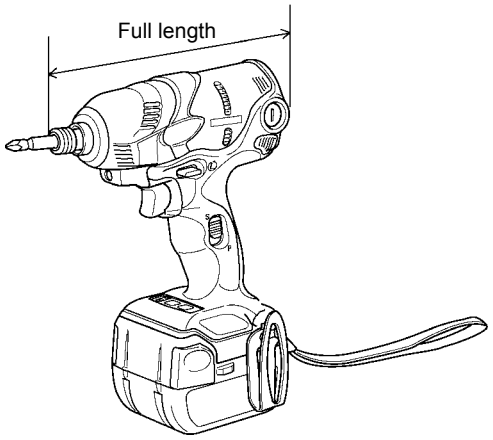
Assembly Diagram for WP 14DSL

SELLING POINTS

❶ Lightweight and compact*

*As of August, 2009 researched by Hitachi
(14.4 V Class Cordless Oil Pulse Driver)

The Hitachi Cordless Oil Pulse Driver (Model WP 14DSL) is superior to the competitive product of Company M in both weight and full length, and can be easily wired even in narrow places.



Maker Model	Weight	Full length
HITACHI WP 14DSL	1.6 kg	169 mm
HITACHI WP 12DM	1.9 kg	177 mm
M	1.7 kg	183 mm

❷ Highest tightening speed and capacity in its class*

*As of August, 2009 researched by Hitachi
(14.4 V Class Cordless Oil Pulse Driver)

The table below shows how long it takes the Hitachi Pulse Driver and our competitor's pulse driver to tighten an H/L sharp point screw (ø 4.5 x 90) into lauan wood. These are approximate values since screwing times depend on wood hardness, ambient temperature, battery conditions, and other factors.

(1) H/L sharp point screw (4.5 mm dia. x 90 mm long), lauan wood

Manufacturer	Voltage	Model	← Fast … Slow → (1 2 3 4 5 (sec.))
HITACHI	14.4 V	WP 14DSL	2.7
M	14.4 V		2.8

The table below shows how many H/L sharp point screws (4.5 mm dia. x 90 mm long) can be tightened into lauan wood per battery. These are approximate values since screwing times depend on wood hardness, ambient temperature, battery conditions, and other factors.

(2) H/L sharp point screw (4.5 mm dia. x 90 mm long), lauan wood

Manufacturer	Voltage	Model	← Few … Many → (20 40 60 80 100 120 140 160 180 200 (pcs.))
HITACHI	14.4 V	WP 14DSL	130
HITACHI	12.0 V	WP 12DM	105
M	14.4 V		110

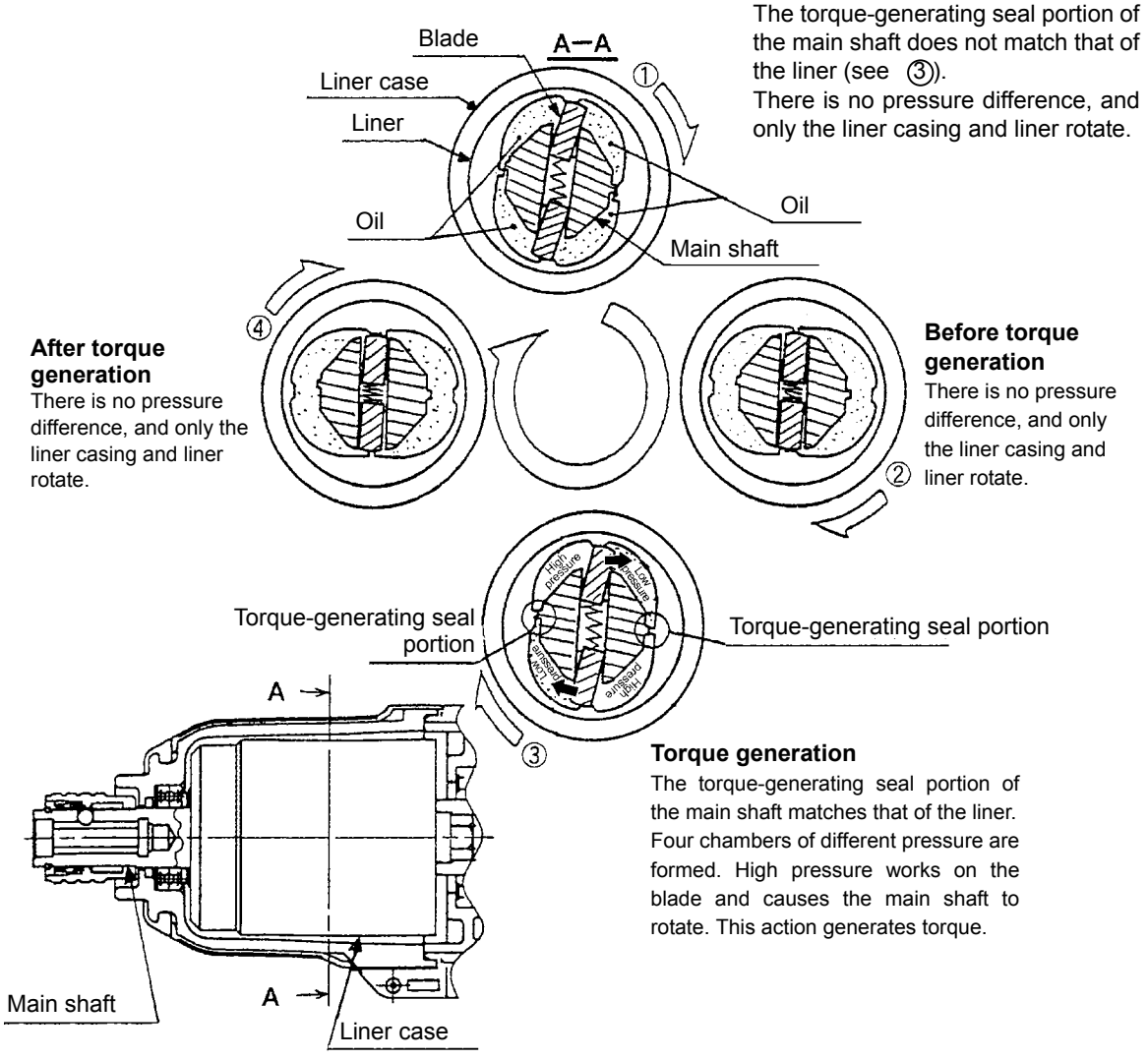
❸ Quiet: 75 dB

While the impact mechanism of a conventional impact driver generates impact force by striking iron pieces for impact driving, an oil pulse driver generates high impact force by applying motor rotational force to an oil pulse section (in an oil pressure mechanism), thereby increasing oil pressure in the section and using this force for tightening screws. The oil pulse driver is much quieter than the impact driver since it does not strike iron pieces to generate force.

<Noise when tightening H/L sharp point screw (ø 5.3 x 120mm) into cedar lumber>

Manufacturer	Voltage	Model	60 70 80 90 100 (dB)
HITACHI	14.4 V	WP 14DSL	75
	12.0 V	WP 12DM	70
	14.4 V	WH 14DSL	84
M	14.4 V		75

• Impact mechanism of oil pulse driver



Motor rotation
The torque-generating seal portion of the main shaft does not match that of the liner (see ③).
There is no pressure difference, and only the liner casing and liner rotate.

After torque generation
There is no pressure difference, and only the liner casing and liner rotate.

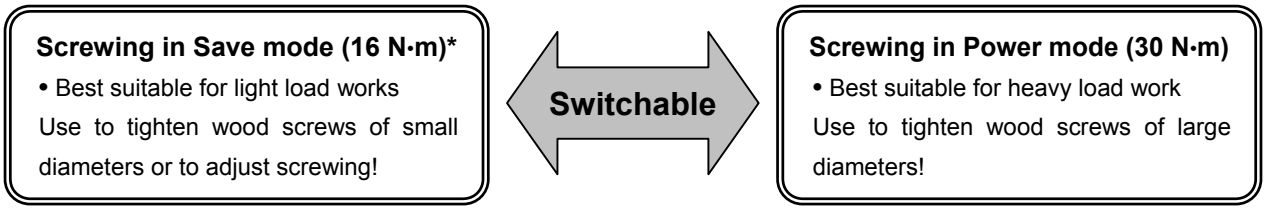
Before torque generation
There is no pressure difference, and only the liner casing and liner rotate.

Torque generation
The torque-generating seal portion of the main shaft matches that of the liner. Four chambers of different pressure are formed. High pressure works on the blade and causes the main shaft to rotate. This action generates torque.

As shown in operations①,②,③, and ④ above, this mechanism generates one torque per revolution of the main shaft (one impact per revolution).

❹ With a 2-stage switching function (rotational speed and number of impacts)

With the changeover lever, you can change impact force in two modes. Use Save mode to tighten small-diameter wood screws or for driving screws into soft wood. Use Power mode to tighten large-diameter wood screws or for driving screws into hard wood. It is very convenient for you to change screwing force according to the purpose of work and work conditions.


Screwing in Save mode (16 N·m)*
• Best suitable for light load works
Use to tighten wood screws of small diameters or to adjust screwing!
Switchable
Screwing in Power mode (30 N·m)
• Best suitable for heavy load work
Use to tighten wood screws of large diameters!

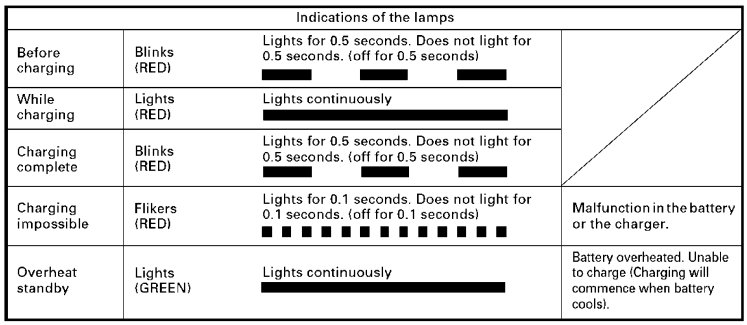
***: Notes on use in Save mode: When operating the Pulse Driver continuously in Save mode, note that electronic circuitry components inside the switch may get hot and even burn in extreme cases.**

SPECIFICATIONS

1. Specifications

<table>
<tr><td colspan="2">Item \ Model</td><td>WP 14DSL</td></tr>
<tr><td colspan="2">Capacity</td><td>Machine screw*1: 4 to 8 mm
Wood screw: 3.5 mm to 9.5 mm</td></tr>
<tr><td colspan="2">Tightening torque</td><td>30 N•m (306 kgf•cm 266 in-lbs.)</td></tr>
<tr><td colspan="2">Tip condition</td><td>6.35 mm (1/4”) bit holder</td></tr>
<tr><td colspan="2">Type of motor</td><td>Fan-cooled, rare-earth magnet motor</td></tr>
<tr><td rowspan="3">Enclosure</td><td>Main body</td><td>Polyamide resin + elastomer ----------Housing
Aluminum alloy die casting----------Hammer case
Polyamide resin----------Front cover</td></tr>
<tr><td>Battery</td><td>Polycarbonate resin</td></tr>
<tr><td>Charger</td><td>ABS resin</td></tr>
<tr><td colspan="2">Type of switch</td><td>Trigger switch with forward/reverse changeover pushing button (with brake)</td></tr>
<tr><td colspan="2">No-load rotation speed</td><td>0 to 2,600 min^{-1} (power mode) / 0 to 2,000 min^{-1} (save mode)</td></tr>
<tr><td colspan="2">Impact rate</td><td>0 to 1,600 min^{-1} (power mode) / 0 to 1,200 min^{-1} (save mode)</td></tr>
<tr><td rowspan="2">Weight</td><td>Net</td><td>Main body (including Type BSL 1430 Battery) ---------1.6 kg
Charger unit (including cord) ----------0.5 kg</td></tr>
<tr><td>Gross</td><td>4.2 kg</td></tr>
<tr><td colspan="2">Overall length x height</td><td>169 mm x 238 mm</td></tr>
<tr><td rowspan="4">Battery (Type BSL 1430)</td><td>Type of battery</td><td>Sealed cylindrical lithium-ion storage battery</td></tr>
<tr><td>Nominal voltage</td><td>DC 14.4 V</td></tr>
<tr><td>Nominal life</td><td>Charging/discharging: approximately 1,500 times</td></tr>
<tr><td>Nominal capacity</td><td>3.0 Ah</td></tr>
<tr><td colspan="2">Charger
(Model UC 18YRSL)</td><td>Overcharge protection system:
(1) Stop current detection
(2) Battery surface temperature detection (thermistor)
(3) 180 minute timer

Power input: 90 W
Charging time: Approx. 45 minutes [for Type BSL 1430 Battery at 20°C (68°F)]
Operable ambient temperature range: 0°C to 40°C (32°F to 104°F)
The maximum allowable temperature of the Type BSL 1430 Battery is 50°C (122°F).

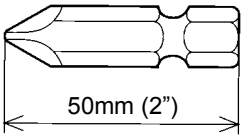
Indication method of battery charging function
 
Indications of the lamps
Before charging
Blinks (RED)
Lights for 0.5 seconds. Does not light for 0.5 seconds. (off for 0.5 seconds)
While charging
Lights (RED)
Lights continuously
Charging complete
Blinks (RED)
Lights for 0.5 seconds. Does not light for 0.5 seconds. (off for 0.5 seconds)
Charging impossible
Flikers (RED)
Lights for 0.1 seconds. Does not light for 0.1 seconds. (off for 0.1 seconds)
Malfunction in the battery or the charger.
Overheat standby
Lights (GREEN)
Lights continuously
Battery overheated. Unable to charge (Charging will commence when battery cools).

NOTE: The Model UC 18YRSL cools an overheated battery by using the cooling fan in standby mode.</td></tr>
<tr><td>Standard accessories</td><td>LSRK</td><td>• Charger (Model UC 18YRSL) ----------1
• Battery (Type BSL 1430) ----------2
• Case ----------1
• Battery cover----------1</td></tr>
</table>

*1: Down to 3 mm of tapping screw

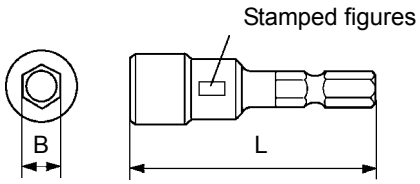
2. Optional Accessories

(1) Plus driver bit



Bit No.	Code No.
No. 2	992671
No. 3	992672

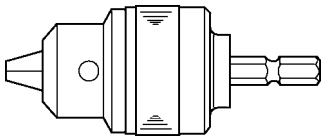
(2) Hexagon socket



Part name	Stamped figures	Code No.	L (mm)	B (mm)
4 mm hexagon socket	7	992689	65 (2-9/16")	7 (1/4")
5 mm hexagon socket	8	996177	65 (2-9/16")	8 (5/16")
6 mm hexagon socket	10	985329	65 (2-9/16")	10 (3/8")
5/16" hexagon socket	12	996178	65 (2-9/16")	12 (15/32")
8 mm hexagon socket	13	996179	65 (2-9/16")	13 (1/2")
10 mm hexagon socket (small type)	14	996180	65 (2-9/16")	14 (9/16")
10 mm hexagon socket	16	996181	65 (2-9/16")	16 (5/8")
10 mm hexagon socket	17	996182	65 (2-9/16")	17 (21/32")

(3) Drill chuck adaptor set (Code No. 321823)

The drill chuck adaptor set permits the mounting of various types of locally available drills for a variety of drilling operations.



COMPARISON WITH SIMILAR PRODUCTS

1. Comparison of Specifications

(Superior specifications:)

Item				Maker / Model	HITACHI WP 14DSL (LSRK)	HITACHI WP 12DM (RCK)	HITACHI WH 14DSL (2SLCK)	M
Catalog values	Capacity	Machine screw	mm		4 to 8	-	4 to 8	4 to 8
		Wood screw	mm		3.5 to 9.5	3.5 to 9.5	M5 to M14	-
		Ordinary bolt			-	-	M5 to M12	M6 to M10
	Max. tightening torque		N•m		Power mode (P): 30 Save mode (S): 16	-	Power mode (P): 145 Save mode (S): 80	30
	width across flat of bit		mm		6.35	6.35	6.35	6.35
	No-load rotation speed		min^{-1}		Power mode (P): 0 to 2,600 Save mode (S): 0 to 2,000	0 to 2,300	Power mode (P): 0 to 2,600 Save mode (S): 0 to 2,000	0 to 2,400
	Impact rate		min^{-1}		Power mode (P): 0 to 1,600 Save mode (S): 0 to 1,200	0 to 1,500	Power mode (P): 0 to 1,600 Save mode (S): 0 to 1,200	0 to 1,600
	Main body weight		kg		1.6	1.9	1.4	1.7
Measured values	Maximum tightening torque*1		N•m		28.4	23.7	153*2	24.8
	No-load rotation speed		min^{-1}		Power mode (P): 0 to 2,632 Save mode S): 0 to 1,928	0 to 2,280	Power mode (P): 0 to 2,580 Save mode (S): 0 to 1,960	-
	Impact rate		min^{-1}		0 to 1,500	0 to 1,590	Power mode (P): 0 to 2,790 Save mode S): 0 to 2,210	-
	Full length x height x center height		mm		169.8 x 237.2 x 29	177 x 228 x 26.5	145 x 235 x 29	-
	Main body weight		kg		1.69	1.91	1.49	1.70
	Full-load load noise		dB		74.7	69.6	84.1	75.3
Impact switch					Equipped	None	Equipped	None
LED light					Equipped	None	Equipped	Equipped
Case					Plastic	Plastic	Plastic	Plastic
Battery indicator					Equipped	None	Equipped	None
14.4V battery (Li-ion/Ni-MH)	Type				BSL 1430	EB 1230R	BSL 1430	BL 1430
	Mount type				Slide	Plug-in	Slide	Slide
	Nominal capacity		Ah		3.0	3.0	3.0	3.0
	Protective circuit				Equipped	None	Equipped	Equipped
Charger	Model				UC 18YRSL	UC 24YH	UC 18YSL2	DC 18RA
	Charging time		min.		45	21	22	22
	Battery mount type				Slide	Plug-in	Slide	Slide
Standard accessory					• Charger • Casing • Plus bit • Aux. battery • Hook	• Charger • Casing • Plus bit • Hook	• Charger • Casing • Plus bit • Aux. battery • Hook	• Charger • Casing • Plus bit • Aux. battery • Hook

*1: Torque to tighten a torque tester for one second

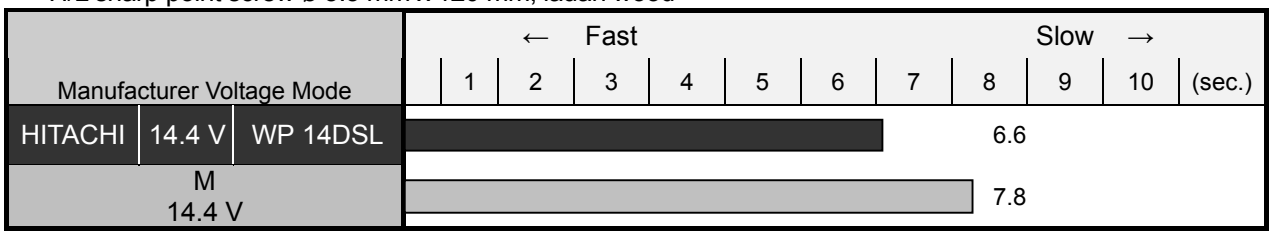
*2: Torque to tighten an M14 high-tensile bolt (Strength class 12.9) for 3 seconds

2. Screwing Time and Capacity (Number of Screws Tightened)

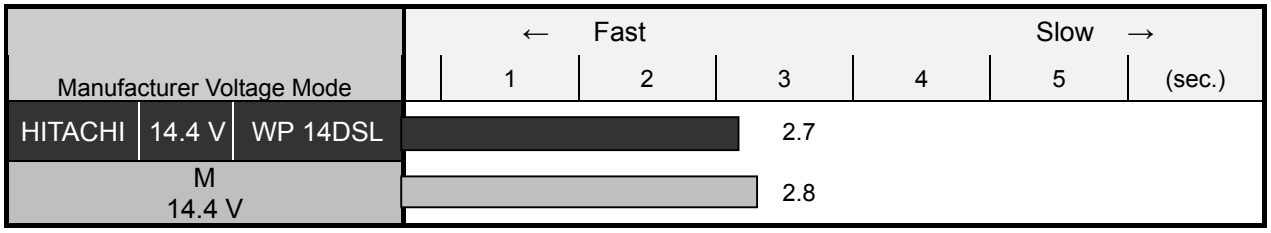
(1) Screwing time

The table below compares the screwing time for the Hitachi pulse driver with that of our competitor's pulse driver. The screwing times are approximate since they are dependent upon wood hardness, ambient temperature, battery conditions, and other factors.

<H/L sharp point screw ø 5.3 mm x 120 mm, lauan wood>



<H/L sharp point screw ø 4.5 mm x 90 mm, lauan wood>



(2) Screwing capacity per charge

The table below compares the screwing capacity per charge for the Hitachi pulse driver with that of our competitor's pulse driver. The screwing capacity (or numbers of screws tightened) indicates approximate values, and actually depends on the screwing material state, screw diameter, ambient temperature, battery characteristics, and other factors.

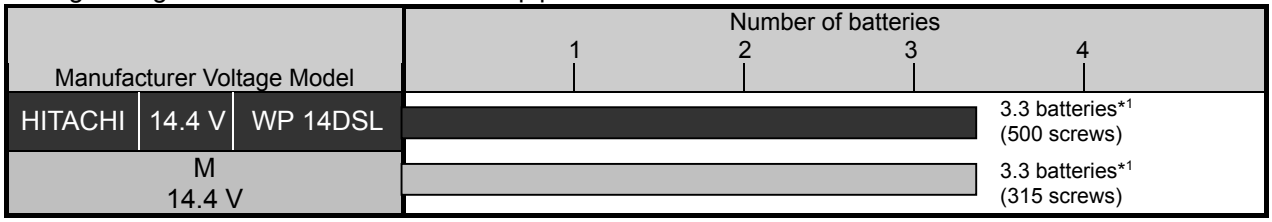
<Screwing capacity (Numbers of screws actually tightened) >

Maker / Model / Tightening condition	HITACHI		
	WP 14DSL 14.4 V	WP 12DM 12.0 V	M 14.4 V
Battery	BSL 1430	EB 1230R	BL 1430
Nominal capacity	3.0 Ah	3.0 Ah	3.0 Ah
H/L sharp point screw ø 4.0 x 50L (lauan wood, no prepared hole)	590 screws	440 screws	540 screws
H/L sharp point screw ø 4.2 x 75L (lauan wood, no prepared hole)	300 screws	235 screws	250 screws
H/L sharp point screw ø 4.5 x 90L (lauan wood, no prepared hole)	130 screws	105 screws	110 screws
H/L sharp point screw ø 5.3 x 120L (lauan wood, no prepared hole)	60 screws	50 screws	50 screws

3. Continuous Service Durability

The table below compares the continuous service durability of the Hitachi pulse driver with that of our competitor's pulse driver. The continuous service durability in the table shows approximate values, and actually depends on the presence of any wood knots, wood hardness due to the percentage of moisture content, ambient temperature, battery characteristics, and other factors.

<Tightening of ø 4.5 mm x 90 mm H/L sharp point screws>



*1: After continuous screwing work by 3.3 batteries, the oil pulse and motor portions get hot, but the pulse driver can continue tightening H/L sharp point screws.

PRECAUTIONS ON SALES PROMOTION

1. Safety Instructions

In the interest of promoting the safest and most efficient use of the Model WP 14DSL Cordless Oil Pulse Driver by all our customers, it is very important when concluding a sale that the salesperson carefully ensure that the buyer seriously recognizes the importance of the Handling Instructions, and fully understands the precautions listed on the Caution Plate and Nameplate attached to each tool.

A. Handling instructions

Salespersons must be thoroughly familiar with the contents of the Handling Instructions in order to give pertinent advice to the customers. In particular, they must possess a thorough understanding of the precautions on using cordless tools that differ from those of ordinary electric power tools.

(1) Before use, ensure that the battery is fully charged.

A new battery is not fully charged. Even if the battery was fully charged at the factory, long periods of inactivity, such as during shipment, cause the storage battery to lose its charge. Customers must be instructed to fully charge the battery prior to use.

(2) To charge the storage battery, only use the dedicated Model UC 18YRSL Charger provided with the tool.

Given the design of the rapid-charging feature (for charging in about one hour), the use of other battery chargers is hazardous.

(3) Follow the prescribed steps for using the charger.

First connect the Type BSL 1430 Storage Battery to the Model UC 18YRSL Charger, and then plug the charger into an AC outlet (ensuring that the voltage matches that indicated on the unit). Reversing this order may result in charger malfunction.

(4) Ensure the power source voltage is the same as that indicated on the charger's nameplate.

The use of any other power source (e.g., DC outlet, fuel powered generator) will cause the charger to overheat and burn out.

(5) Do not use any voltage-increasing equipment (e.g., transformer) between the power source and charger.

Using the charger with voltage higher than that indicated on the unit will result in malfunction.

(6) Conduct battery charging in an ambient temperature range of 0° to 40 °C (32 °F to 104 °F).

Special temperature-sensitive devices are employed in the charger to permit rapid charging. Ensure that customers are instructed to use the charger within the indicated ambient temperature range. At temperatures below 0 °C (32 °F), the thermostat will not function properly, and the storage battery may be overcharged. At temperatures above 40 °C (104 °F), the storage battery cannot be sufficiently charged. The optimum temperature range is 20 °C to 25 °C (68 °F to 77 °F).

(7) The battery charger should not be used continuously.

Charging more than three storage batteries in succession at high ambient temperature will cause the temperature of coils on the transformer to rise, running the risk of the temperature fuse inside the transformer inadvertently melting. After charging one battery, please wait at least 15 minutes before charging the next battery.

(8) Do not insert foreign objects into the air vents on the charger.

The charger case is equipped with air vents to protect internal electronic components against overheating. Caution the customer not to drop or insert such foreign matter as metallic or flammable objects into the air vents. This could cause electrical shock, fire or other serious hazards.

(9) Do not attempt to disassemble the storage battery or charger.

Special devices such as a thermostat are built into the storage battery and charger to permit rapid charging. Incorrect parts replacement and/or wiring will cause malfunctions that could result in fire or other hazards. Instruct the customer to bring these units to an authorized service center for any necessary repair or replacement.

(10) Properly dispose of the storage battery.

Ensure that all customers understand that storage batteries should be returned to the Hitachi power tool sales outlet or authorized service center when the batteries can no longer be recharged or repaired. If thrown into a fire, the batteries may explode.

(11) Effects of permanent magnet

The Model WP 14DSL has a strong permanent magnet in its motor. Please instruct the customers about dust adhering to the Model WP 14DSL and the effects on electronic devices as follows:

- Do not place the Model WP 14DSL on a workbench or in a work area subject to the scattering of metal dust.
- Do not touch a dusty Model WP 14DSL. Instruct the customers to remove adhered dust with a brush.
- The users of such medical electronic products such as a pacemaker must not use or approach the Model WP 14DSL.
- Do not bring precision equipment such as a mobile phone or electronic recording media such as a magnetic card near the Model WP 14DSL.

(12) Keep the battery free of dust.

- Protect the battery against being covered with dust during operation.
- Protect the battery against being covered with dust accumulated on the Model WP 14DSL during operation.
- Do not leave the battery in a dusty area when not in use.
- Remove dust from the battery and store it separately from such metallic parts as screws and nails.

B. Caution plate

(1) The following cautions are listed on the Nameplate attached to the main body of each tool.

[For the USA and Canada]

WARNING
- To reduce the risk of injury, user must read and understand Instruction Manual.

AVERTISSEMENT
- Afin de réduire le risque de blessures, l'utilisateur doit lire et bien comprendre le mode d'emploi.

(2) The following cautions are listed on the Nameplate attached to each storage battery.

[For Europe]

CAUTION
• Read thoroughly HANDLING INSTRUCTIONS before use.
• Do not disassemble nor throw into fire.

[For the USA and Canada]

CAUTION
• Read thoroughly HANDLING INSTRUCTIONS before use.
• Do not disassemble nor throw into fire.

(3) The following cautions are listed on the Nameplate attached to the Model UC 18YRSL Charger.

[For the USA and Canada]

• For safe operation, see instruction manual.
CAUTION • Charge HITACHI rechargeable batteries types BSL 14, BSL 18 series. Other types of batteries may burst causing personal injury and damage. • Charge between 32 °F and 104 °F. Rest 15 minutes between the charging of batteries. • Indoor use only. • Replace defective cord immediately. • Do not install on or over combustible surfaces
AVERTISSEMENT

2. Not Using the Pulse Driver at -5 °C or Lower

Do not use the Pulse Driver in a working environment of –5 °C or lower or after storing it for a long time at –5 °C or lower. Using the Pulse Driver under such a condition will generate no impact (torque) when you operate the switch or may disable the motor due to overload and the extremely reduced number of impacts. Please tell the users to warm up the Pulse Driver (by tightening some short screws before beginning ordinary tightening work.

3. About Reduction in Tighten Torque

(1) Battery voltage ---------- The tightening torque of the Pulse Driver is affected by battery voltage. The battery voltage gradually goes down as more screws are tightened. In particular, the battery voltage quickly drops just before activation of the over-voltage prevention circuit.
This symptom is specific to cordless oil pulse drivers and impact drivers/wrenches. Therefore, please ask the users to understand these characteristics before using the tool.

Notices on use of Type BSL 1430 battery (lithium ion battery)

To prolong battery service life, the Pulse Driver is equipped with a protective function to stop output. In case of low remaining battery charge (when the battery voltage drops down to approx. 8 V), this function stops the motor, even if you are pulling the switch. This is no failure since it is caused by the protective function.
In this case, please tell the user to recharge the battery as soon as possible.

(2) Low ambient temperature ---------- At very low ambient temperature, oil and grease in the Pulse Driver become less viscous and lubricative, thereby resulting in reduced tightening torque.

(3) Different kinds of wood ---------- The hardness of wood depends upon percentage of moisture in the wood. The tighten torque reduces when the wood is hard.

4. Notes on use of the Charger and the Battery

(1) The battery should not be recharged just after you stop using the Pulse Driver .
If the battery (Type BSL 1430) becomes very hot (such as when exposing the Pulse Driver to direct sunlight for a long time or just after you stop using the Pulse Driver), the charge indicators of the charger may not light when you connect the Pulse Driver to the charger. See the table below for the chargeable battery temperature range.
In such a case, please tell the user to place the battery pack in a cool well-ventilated place, allow it to fully cool down, and then recharge it.
The charging time ranges from a few minutes to about 10 minutes, depending on tightening load, service hours, ambient temperature, and other factors.

<Chargeable battery temperature range>

Battery	Battery temperature
	UC 18YRSL
BSL 1430	0 °C to 50 °C

5. Continuous Tightening Work

(1) When used continuously to tighten wood screws, the Pulse Driver becomes hot and may exhibit degraded performance (such as reduced torque). In this case, allow the Pulse Driver to fully cool down. Once the Pulse Driver has cooled down, you can use it again.
Such continuous work should be avoided, with about a 15 minute idle period prior to using the Pulse Driver again after changing the batteries.

(2) The front cover of the Pulse Driver becomes very hot during continuous tightening work. Do not touch it.

6. Other Notices

(1) Countermeasures against impacts and water
This Pulse Driver contains high-precision parts. Be careful not to drop it, subject it to any strong force, or wet it with water. These actions may cause failure or malfunction of the Pulse Driver.

REPAIR GUIDE

WARNING: Always remove the battery from the main body before starting repair or maintenance work. Because the tool is cordless, leaving the battery inside and inadvertently activating the switch will start unexpected motor rotation, possibly resulting in serious injury.

1. Precautions on Disassembly and Reassembly

The **[Bold]** numbers in the descriptions below correspond to item numbers in the Parts List and exploded view assembly diagram of the Model WP 14DSL.

Disassembly

1. Guide Sleeve (A)

Follow the steps in Fig.1. You can take out Retaining Ring **[1]**, Retainer **[2]**, Guide Spring **[3]**, and Guide Sleeve (A) **[4]** in this order. Be careful not to lose the two Steel Balls D3.175 **[12]** in the main shaft hole of the Pulse Unit **[13]**.

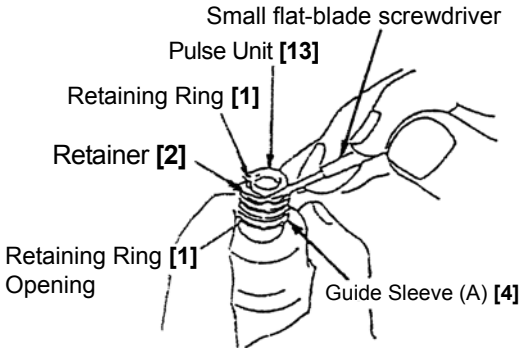


Fig. 1-1

Secure the body of the Pulse Driver, match the opening of Retaining Ring **[1]** to the notch of the main shaft in Pulse Unit **[13]**, and then insert the small flat-blade screwdriver at an angle.

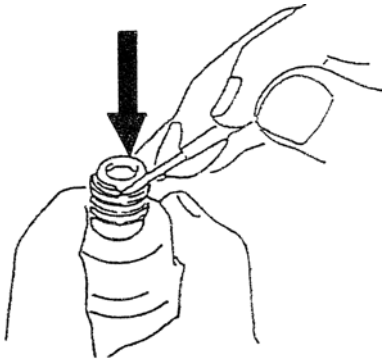


Fig. 1-2

Press down Retainer **[2]** with the small flat-blade screwdriver.

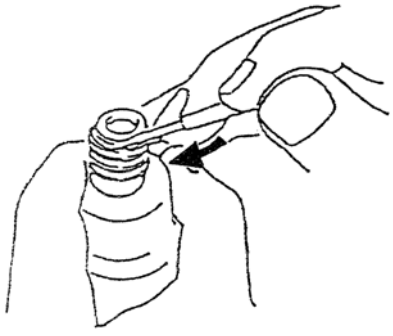


Fig. 1-3

Slide the small flat-blade screwdriver under one side of the gap of the Retaining Ring **[1]**.

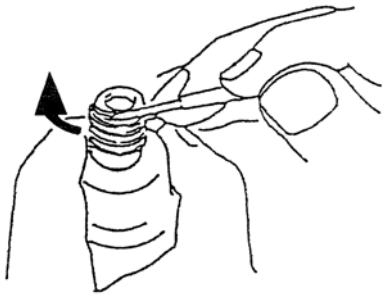


Fig. 1-4

Slowly raise the Retaining Ring **[1]** using the end face of Guide Sleeve (A) **[4]** as a fulcrum.

One side of the opening of Retaining Ring **[1]** rises. Slowly lift the other portion of the opening with the small flat-blade screwdriver. You can then remove it. Do not lift it up too quickly. Otherwise, Retaining Ring **[1]** will pop out.

2. Front Cap, Front Cover

Insert the small flat-blade screwdriver between the Front Cap **[5]** and Front Cover **[6]**, and then remove both from Hammer Case **[7]**.

3. Hook

Remove Truss Hd. Screw M4 (Black) **[38]** and Hook **[37]**. You can conduct disassembly work without removing Hook **[37]**. This would help simplify later disassembly work.

4. Carbon Brush

Remove the two Brush Caps **[32]** of the left and right Carbon Brushes 5 x 6 x 11.5 **[31]**. Remove each Carbon Brush 5 x 6 x 11.5 **[31]** by hooking the flange of Carbon Brush 5 x 6 x 11.5 **[31]** with the small flat-blade screwdriver or similar tool.

5. Housing (B)

Remove the nine Tapping Screws (W/Flange) D4 x 20 (Black) **[33]** from the Pulse Driver. Housing (B) can only be detached when the Brush Caps **[32]** are removed. Be sure to remove the Brush Caps **[32]** before detaching Housing (B). You can remove the Strap (Black) **[48]** after removing Housing (B).

6. DC-Speed Control Switch

(1) The FET of the DC-Speed Control Switch **[45]** is firmly fitted to the housing. Insert the tip of the small flat-blade screwdriver between the FET and Housing (B), and then pry up and remove the FET.

(2) You can remove the Hammer Case **[7]**, Pulse Unit **[13]**, Inner Cover (D) **[25]**, Armature DC 14.4V **[26]**, Magnet (D) **[27]**, Brush Block **[30]**, DC-Speed Control Switch **[45]**, Controller **[46]**, terminal support, and LED light together as one unit. You can also remove Pushing Button (A) **[42]**.

NOTE: Be careful not to damage the three leads extending from the FET. If the leads are broken, the switching speed cannot be varied.

7. Impact mechanism parts

In case of Pulse Unit **[13]** failure, replace the entire unit. Do not disassemble it.

8. Switch assembly

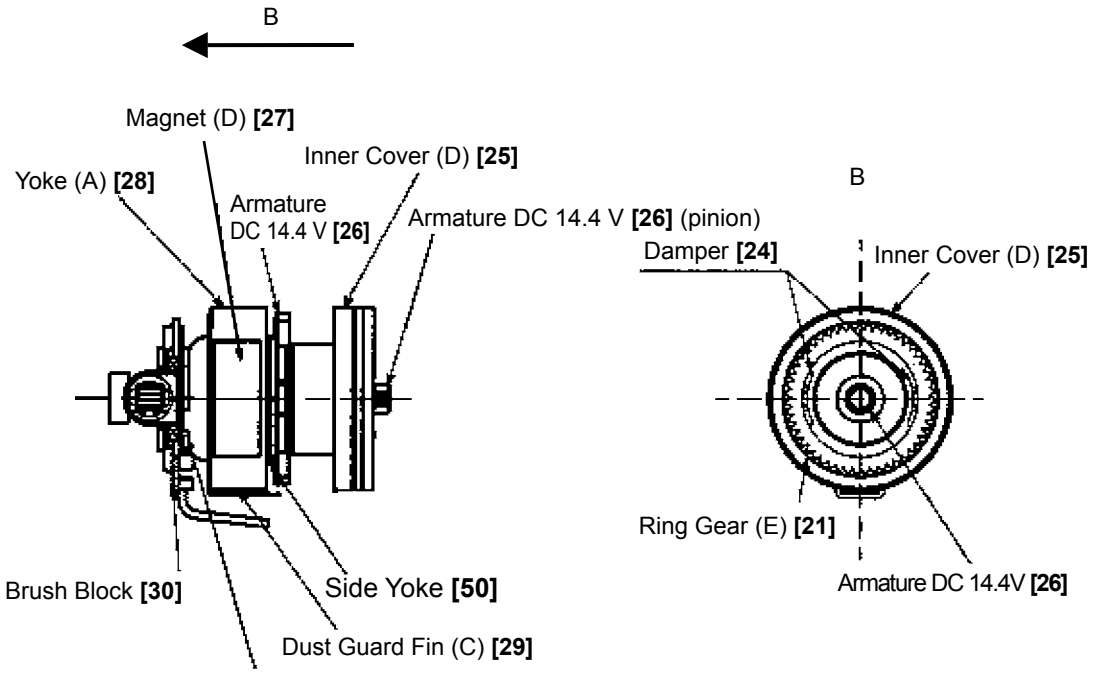
Remove the two Machine Screws (W/Sp. Washer) M3 x 5 **[41]** from the flag terminals when removing the two lead wires (red and black) of Brush Block **[30]** from the DC-Speed Control Switch **[45]**.

NOTE: Three FET lead wires are soldered to the DC-Speed Control Switch [45]. Do not disassemble this setup.

9. Magnet (D), Yoke (A), Dust Guard Fin (C), Side Yoke

Magnet (D) **[27]** has strong magnetic force. Therefore, firmly hold Inner Cover (D) **[25]** and slide it in the direction of B (see Fig. 2) to remove it. Similarly, Dust Guard Fin (C) **[29]** and Side Yoke **[50]** are also magnetically attracted to Magnet (D) **[27]**. Firmly hold Magnet (D) **[27]** and pull both parts in the radial direction for removal. You can remove Yoke (A) **[28]** in the same manner.

Fig. 2 • Magnet (D), Yoke (A), Dust Guard Fin (C), Side Yoke



Fit the projected portion of Dust Guard Fin (C) **[29]** to the depressed portion of Brush Block **[30]**.

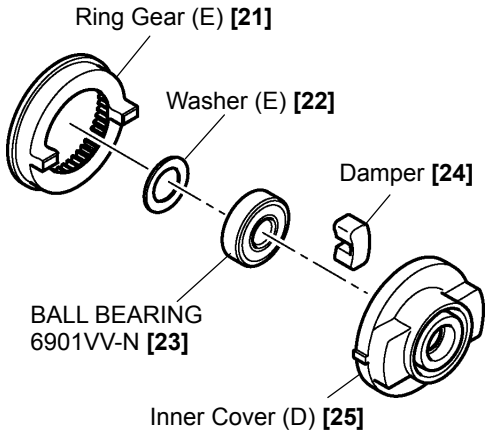
10. Armature

Press down the tip of Armature DC 14.4V **[26]** (pinion) to remove the armature while receiving Inner Cover (D) **[25]** so as not to touch the fan of Armature DC 14.4V **[26]**.

11. Ring Gear (E), Damper

Remove Ring Gear (E) **[21]** from Inner Cover (D) **[25]**, and then use a small flat-blade screwdriver to remove the Damper **[24]**. (See Fig. 3.)

Fig. 3 • Ring Gear (E), Damper



Reassembly

Conduct reassembly by reversing the disassembly procedures, but note the following:

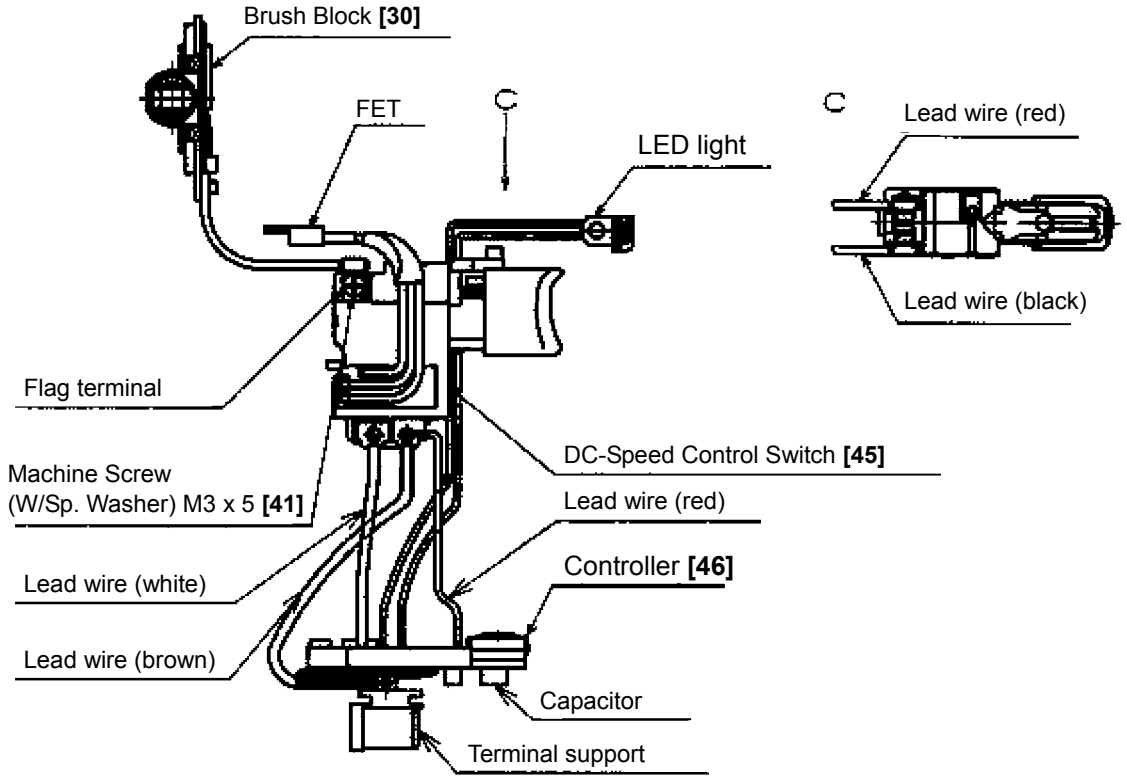
1. Switch-related reassembly

(1) Connect wires of the Controller **[46]** or DC-Speed Control Switch **[45]** according to the connection diagram (Fig. 4) when replacing these units individually. Item (1) is omitted when replacing the Switch Ass'y **[47]**.

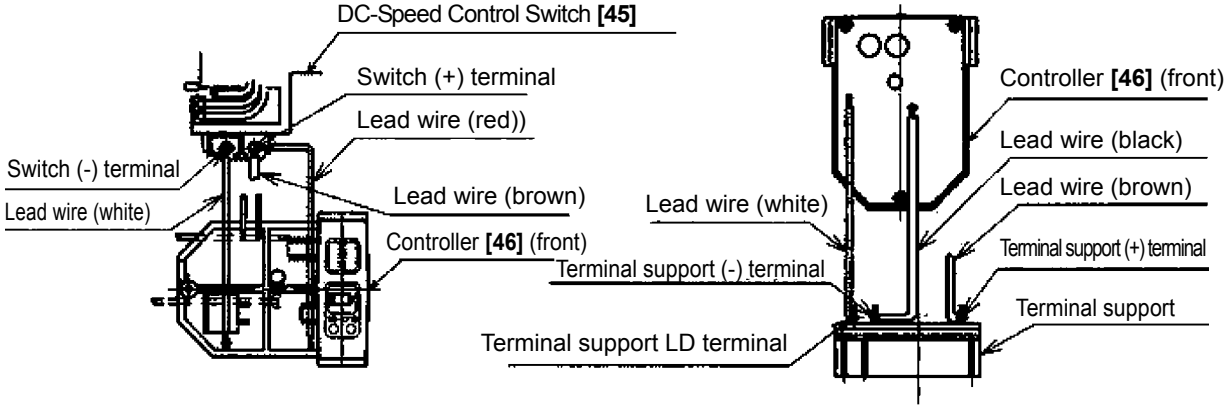
- Solder the red and white lead wires extending from the upper part of the Controller **[46]** to the DC-Speed Control Switch **[45]**. Connect the red lead wire to the "+" terminal of the DC-Speed Control Switch **[45]** and the white lead wire to the "-" terminal. (See Fig. 4 (a).)
- Solder the black and white lead wires extending from the lower part of the Controller **[46]** to terminals of the terminal support. Connect the black lead wire to the "-" terminal of the terminal support and the white lead wire to the LD terminal. (See Fig. 4 (b).)

Fig. 4 • Switch-related reassembly (1)

Connection diagram (a)



Connection diagram (b)

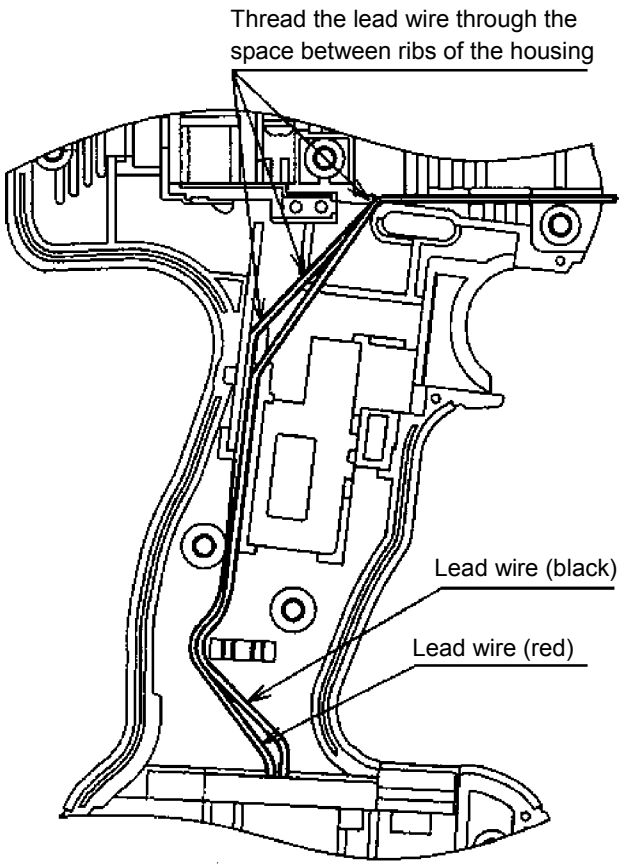


(2) Connect the lead wire of the Brush Block **[30]** to the DC-Speed Control Switch **[45]**, and then secure the flag terminal with Machine Screw (W/Sp. Washer) M3 x 5 **[41]**. Be careful not to reverse the orientation of the flag terminal. (See Fig. 4.)

(3) Assemble the DC-Speed Control Switch **[45]** in Housing (A) with the jut of the CW/CCW lever on the upper part of the switch inserted into the hole of Pushing Button (A) **[42]**.

- Make sure that the Impact Change lever of Housing (A) is set to the "P" position when assembling the DC-Speed Control Switch **[45]** in Housing (A). In the other position, you cannot assemble the DC-Speed Control Switch **[45]** in Housing (A). (See Fig. 6.)
- Thread the lead wire of the LED light through the space between ribs of the housing as shown in Fig.5.

Fig. 5 • Switch-related reassembly (3)

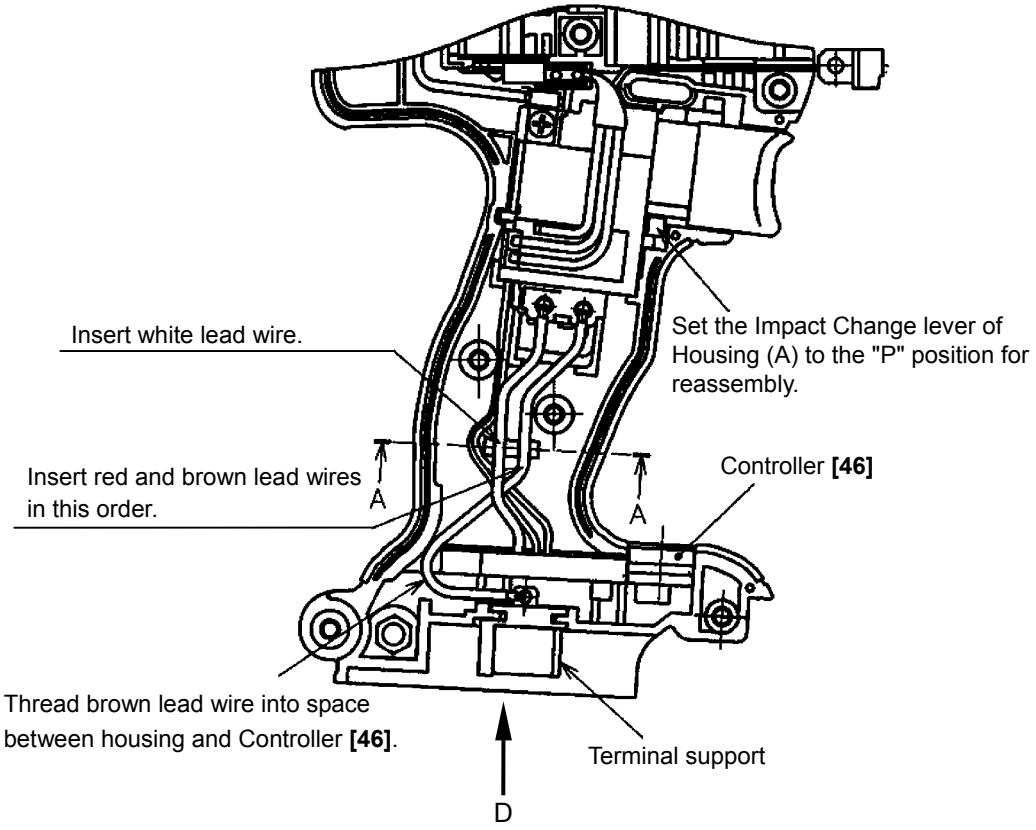


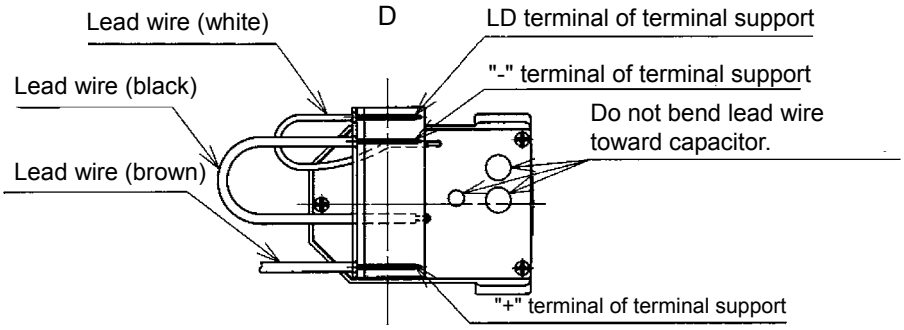
(4) Thread the lead wire connected to the DC-Speed Control Switch **[45]** through the space between ribs as shown in Fig. 6. Insert the white lead wire to the left side of the rib, followed by the red and brown lead wires in this order to the right side from the far side.

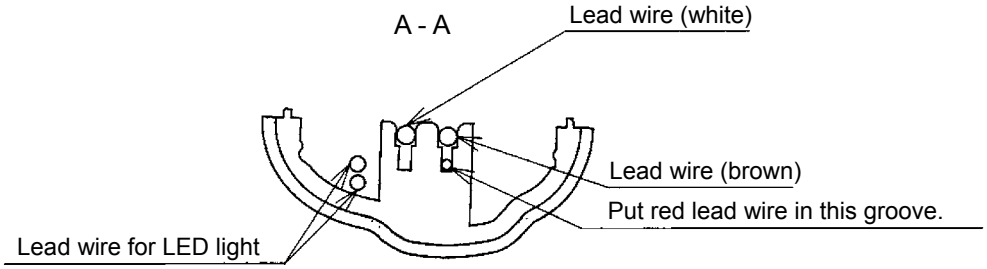
- Bend the lead wire under the Controller **[46]** so that the lead wire can be well set in the housing. Be careful not to break the lead wire when bending it. Do not bend the lead wire toward the capacitor since failure occurs when the lead wire touches the capacitor. (See Fig. 6.)

NOTE: When contaminated with black oxides or having separated plated films, the contacts of the DC-Speed Control Switch [45] with the battery of the terminal support will become very hot and cause Pulse Driver failure. In such case, replace the DC-Speed Control Switch [45] (Code No.326784) with a new one. (See Fig. 6.)

Fig. 6 • Switch-related reassembly (3)(4)


Insert white lead wire.
Set the Impact Change lever of Housing (A) to the "P" position for reassembly.
Insert red and brown lead wires in this order.
A
A
Controller **[46]**
Thread brown lead wire into space between housing and Controller **[46]**.
Terminal support
D


D
Lead wire (white)
LD terminal of terminal support
"-" terminal of terminal support
Lead wire (black)
Do not bend lead wire toward capacitor.
Lead wire (brown)
"+" terminal of terminal support



2. Reassembly of machine components

(1) Armature DC 14.4V related reassembly

- Fit the jut of Dust Guard Fin (C) **[29]** to the depressed portion of Magnet (D) **[27]** and match the outer diameter of Dust Guard Fin (C) **[29]** with that of Magnet (D) **[27]** when reassembling Dust Guard Fin (C) **[29]** to Magnet (D) **[27]**. (See Fig. 7.)
- Assemble Yoke (A) **[28]** to Magnet (D) **[27]** with the depressed portion of Yoke (A) **[28]** fitted to the flange shape of Dust Guard Fin (C) **[29]**. (Do not reverse the orientation of Yoke (A) **[28]**.) (See Fig. 7.)
- Fit the jut of Side Yoke **[50]** to the depressed portion of Magnet (D) **[27]** and match the outer diameter of the Side Yoke **[50]** with that of Magnet (D) **[27]** when assembling the Side Yoke **[50]** to Magnet (D) **[27]**. (See Fig. 7.)
- Press-fit BALL BEARING 6901VV-N **[23]** to Inner Cover (D) **[25]**. Insert the two Dampers **[24]** into Inner Cover (D) **[25]** according to shape. Fit the detent rib of Ring Gear (E) **[21]** to the depressed portion of the Damper **[24]**, and then press-fit Armature DC 14.4V **[26]** to Inner Cover (D) **[25]**.
- Combine the Magnet (D) **[27]** assembly with the Armature DC 14.4V **[26]** assembly.
- Mount the Idle Gear Set **[17]**, Needle Roller **[19]**, and Washer **[16]** on Gear Holder **[18]**, and then insert the Gear Holder **[18]** to Ring Gear (E) **[21]** while paying attention to gear engagement. Then, make sure Gear Holder **[18]** rotates smoothly. If it does not rotate, gear engagement is incomplete. Correct gear engagement.

• Armature DC 14.4V related reassembly

Fig. 7

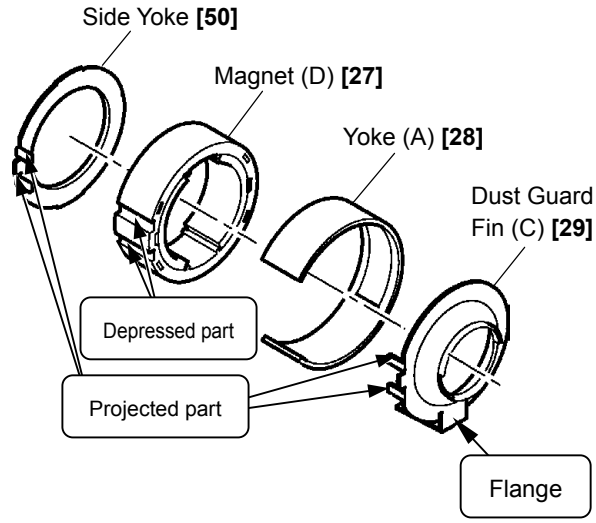
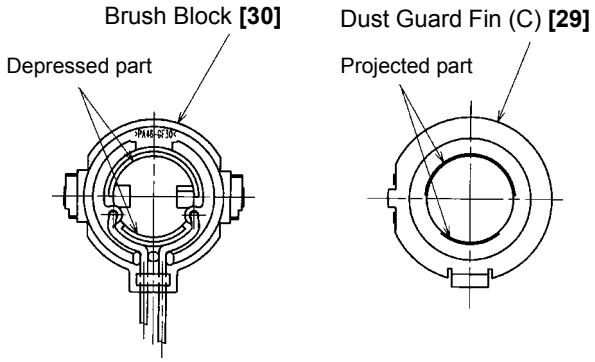


Fig. 8



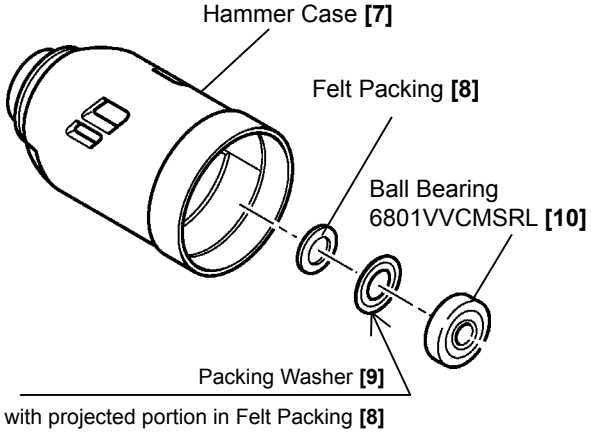
(2) Reassembling the Hammer Case

Make sure the Hammer Case **[7]** contains the Felt Packing **[8]**, Packing Washer **[9]**, and BALL BEARING 6801VVCMSRL **[10]**, and then insert the Pulse Unit **[13]** into the Hammer Case **[7]**.

Press-fit Ball Bearing 6902VVCMPS2L **[15]** to the Bearing Cover **[14]**.

Fit the jut of the Bearing Cover **[14]** having Ball Bearing 6902VVCMPS2L **[15]** to the groove portion of the Hammer Case **[7]**.

Fig. 9 • Reassembling Hammer Case

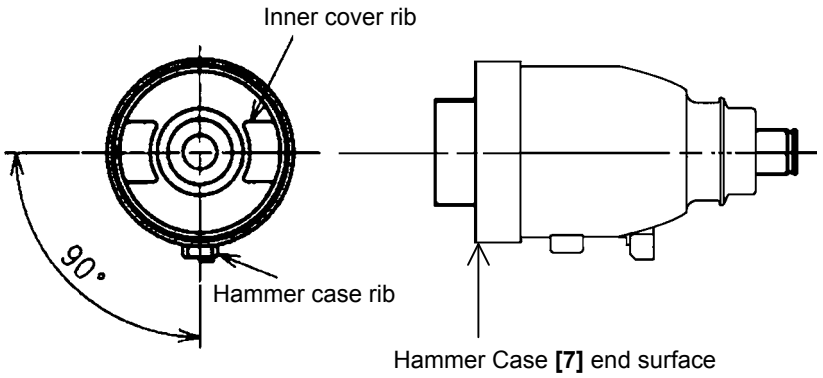


(3) Connecting hammer case assembly and armature assembly

Mount the Washer **[16]** on the Gear Holder **[18]** and push Inner Cover (D) **[25]** into the Hammer Case **[7]** while matching the hexagonal portion of the Pulse Unit **[13]** with that of the Gear Holder **[18]**. Make sure the end surface of Inner Cover (D) **[25]** is located in the farther side than the end surface of the Hammer Case **[7]**.

Locate so that the rib of Inner Cover (D) **[25]** is at right angles to the rib of the Hammer Case **[7]**. (See Fig. 10.)

Fig. 10 • Connecting hammer case assembly and armature assembly



3. Reassembling Housing (A).(B) Set

Mount the Pulse Unit **[13]**, Hammer Case **[7]**, Inner Cover (D) **[25]** (including Armature DC 14.4V **[26]**), Magnet (D) **[27]** (including Yoke (A) **[28]**, Dust Guard Fin (C) **[29]**, and Side Yoke **[50]**), and the Brush Block **[30]** together in Housing (A). (See Fig. 14.)

Notices on reassembly:

- Be sure to fit the projected portion of Dust Guard Fin (C) **[29]** to the depressed portion of the Brush Block **[30]** in advance. (See Fig. 8.)
- Fit the detent depressed portion of Magnet (D) **[27]** to the jut of Housing (A) at reassembly. (See Fig. 7 and Fig. 11.)
- Make the detent jut of Hammer Case **[7]** contact with the detent receiver of the housing (see Fig. 13) when fitting the Hammer Case **[7]** to the housing. Thread the lead wire of LED light through the space between the housing and Hammer Case **[7]** as shown in Fig.12.
- Make sure the Hammer Case **[7]** is correctly set in the housing. If the Hammer Case **[7]** is not set in the preset groove of the housing or if the rib of Inner Cover (D) **[25]** is not at a right angle to the rib of the Hammer Case [7] , then re-fit the Hammer Case **[7]** to the housing. (See Figs. 10, 12, and 13.)
  Only when the Hammer Case **[7]** is correctly fitted can its axial movement be prevented. Therefore, make sure that the Hammer Case **[7]** is correctly fitted to the housing.
- Apply silicon grease (Shin-Etsu Chemical Co., Ltd. KS609) to the DC-Speed Control Switch **[45]** surfaces where the FET and Dust Guard Fin (C) **[29]** contact each other before assembling the DC-Speed Control Switch **[45]** in Housing (A).

NOTE: Without silicon grease on the surface, the FET becomes very hot. Bend the three lead wires from the FET and pass them over the DC-Speed Control Switch [45] without touching Pushing Button (A) [42] as shown in Fig.14. (See Fig.14.)

Fig. 11 • Reassembling Housing (A).(B)Set

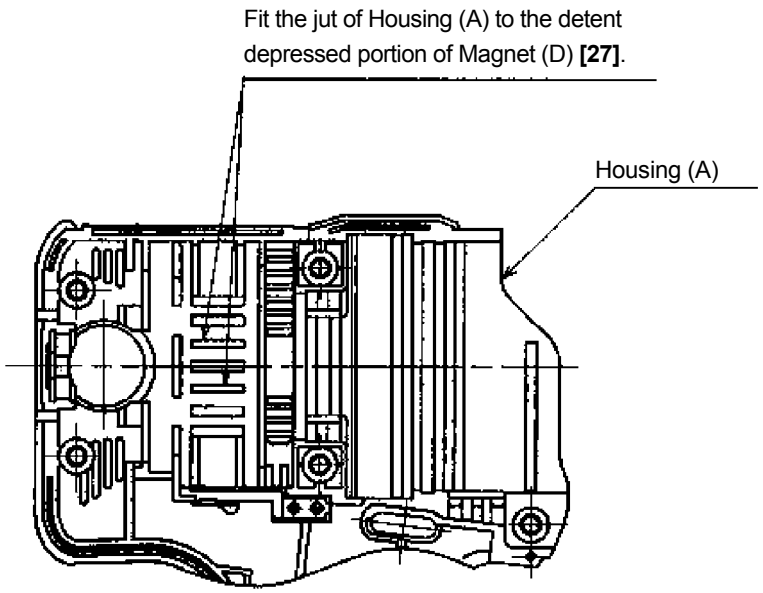


Fig. 12 • Reassembling Housing (A).(B)Set

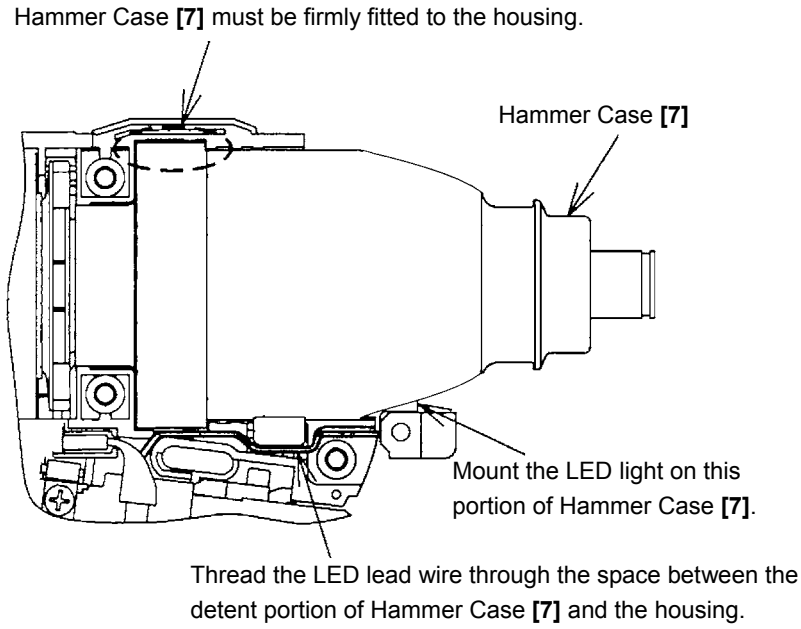
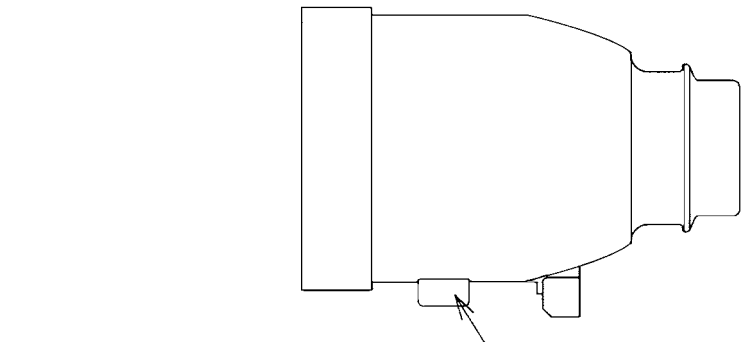

Hammer Case **[7]** must be firmly fitted to the housing.
Hammer Case **[7]**
Mount the LED light on this portion of Hammer Case **[7]**.
Thread the LED lead wire through the space between the detent portion of Hammer Case **[7]** and the housing.

Fig. 13 • Reassembling Housing (A).(B)Set



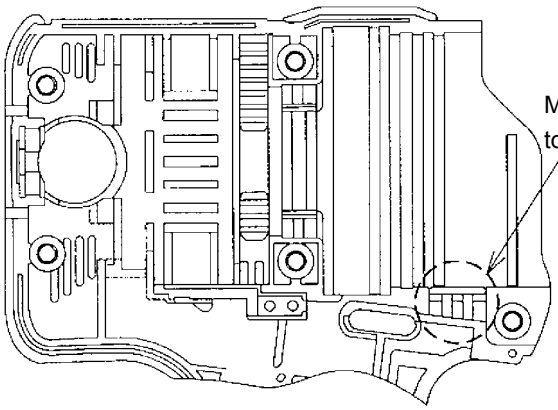
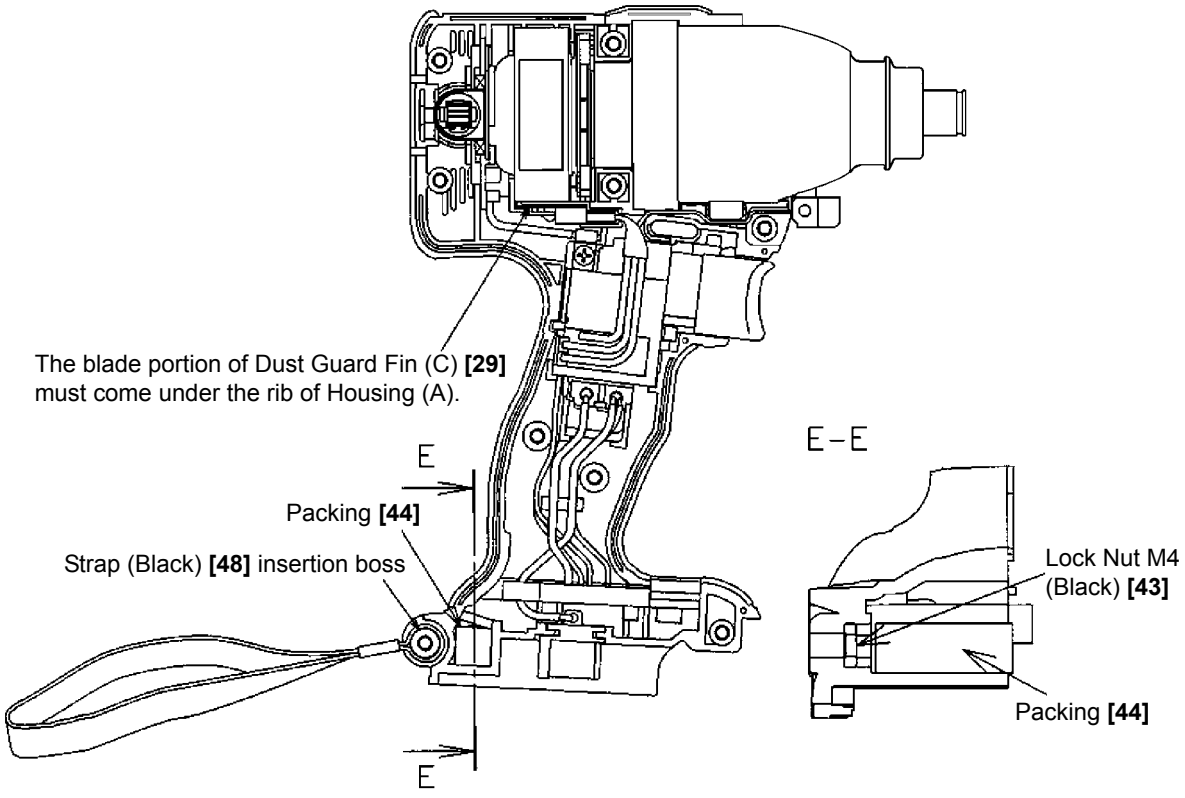


Fig. 14 • Reassembling Housing (A).(B)Set


The blade portion of Dust Guard Fin (C) **[29]** must come under the rib of Housing (A).
E
Packing **[44]**
Strap (Black) **[48]** insertion boss
E
E-E
Lock Nut M4 (Black) **[43]**
Packing **[44]**

4. Reassembling Housing (A).(B)Set

Insert Lock Nut M4 (Black) **[43]** and Packing **[44]** into Housing (A).(B)Set **[39]** as shown in Fig.14, and then insert the Strap (Black) **[48]** into the boss of Fig.14. Next, assemble Housing (B) and tighten the nine Tapping Screws (W/Flange) D4 x 20 (Black) **[33]**.

5. Remounting Front Cover and Front Cap

Fit the Front Cover **[6]** and Front Cap **[5]** to the assembled housing. Make sure the PCB of the LED light is in the LED holder, and fit the jut of the LED holder to the jut of the Hammer Case **[7]**.
After setting the Front Cover **[6]**, mount the Front Cap **[5]** and secure the Front Cover **[6]**.

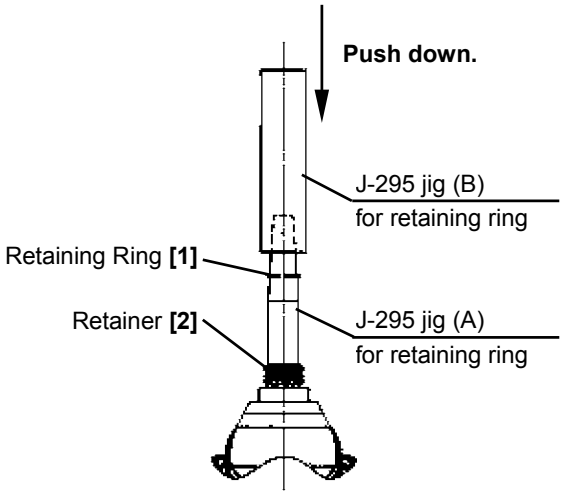
6. Mounting Guide Sleeve (A)

Insert the two Steel Balls D3.175 **[12]** into the main shaft hole of the Pulse Unit **[13]**, reassemble Guide Sleeve (A) **[4]**, Guide Spring **[3]**, and Retainer **[2]** in this order, and then fit the Retaining Ring **[1]** to the main shaft groove of the Pulse Unit **[13]**.

NOTE:

- **Orient the shoulder portion of the Retainer [2] towards the bit at assembly.**
- **The Retaining Ring [1] may be deformed when disassembled and Guide Sleeve (A) [4] may fall. Be sure to replace the Retaining Ring [1] with a new one.**

Fig. 15 • Mounting Guide Sleeve (A)



7. Mounting the Hook

Insert the Hook **[37]** into the groove in the lower portion of the side surface of Housing (A),(B), and then tighten Truss Hd. Screw M4 (Black) **[38]** to secure it. Do not tighten Truss Hd. Screw M4 (Black) **[38]** too quickly. Doing so may result in Lock Nut M4 (Black) **[43]** becoming idle in the housing and possibly sliding off. To prevent this situation, slowly turn Truss Hd. Screw M4 (Black) **[38]** so as to engage Lock Nut M4 (Black) **[43]**.
The Hook **[37]** can be mounted on any side (left or right) of the Pulse Driver

Application of lubricant

(1) ATTOLUB MS No. 2
- Armature DC 14.4V **[26]** pinion gear face, Ring Gear (E) **[21]** face, and gears of the two Idle Gear Sets **[17]**
- Two Steel Balls D3.175 **[12]**

(2) HITACHI MOTOR GREASE No. 29
- Main shaft (Pulse Unit **[13]** component) surface on which Guide Sleeve (A) **[4]** slides
- Housing (A) assembly surface on which Lever (C) **[40]** slides

(3) MOLUB-ALLOY 777-1
- ø 5 holes of the two Idle Gear Sets **[17]**
- Entire peripheral surface of the Needle Roller **[19]**

Checks after Reassembly

Check the following after reassembly.

(1) ON/OFF check of the LED light and the battery indicator lamps

Press the Light switch of the Controller **[46]** and make sure that the LED lights. After the LED lights, press the Light switch once more and make sure the LED goes off.

Then press the Battery Indicator switch and make sure that both two battery indicator lamps light. Use the fully charged battery pack for Lamp ON/OFF checks and hold down the Battery Indicator switch during the Lamp ON/OFF check. When you release the Battery Indicator switch, the battery indicator lamps go off.

(2) Rotational direction check

Check and make sure the rotational direction of the Pulse Unit **[13]** matches the direction of rotation made when you press Pushing Button (A) **[42]**. When you press Pushing Button (A) **[42]** to the (R) position, the Pulse Unit **[13]** must rotate right (clockwise) (when viewed from the back opposite to Guide Sleeve (A) **[4]**).

Screw Tightening Torques

- Tapping Screw (W/Flange) D4 x 20 (Black) **[33]** ---------- 1.96 ± 0.49 N•m {20 ± 5 kgf•cm}
- Machine Screw (W/Sp. Washer) M3 x 5 **[41]** ---------- 0.29 to 0.39 N•m {3 to 4 kgf•cm}
- Brush Cap **[32]** ---------- 0.78 ± 0.10N•m {8 ± 1 kgf•cm}
- Truss Hd. Screw M4 (Black) **[38]** ---------- 1.8 ± 0.40 N•m {18 ± 4 kgf•cm}

2. Precautions on Disassembly and Reassembly of the Battery Charger

Refer to the Technical Data and Service Manual for precautions on disassembly and reassembly of the Model UC 18YRSL Battery Charger.

STANDARD REPAIR TIME (UNIT) SCHEDULES

MODEL	Variable / Fixed	10	20	30	40	50	60 min.
WP 14DSL		Work Flow					
		Hook	Switch Ass'y	Housing (A). (B)Set			
			Inner Cover (D) Armature DC 14.4V Magnet (D) Brush Block				
	General assembly	Guide Sleeve (A)	Hammer Case Ring Gear (E)	Pulse Unit Bearing Cover Ball Bearing 6902VVCMPS2L Idle Gear Set Gear Holder Ball Bearing 6901VV-N			

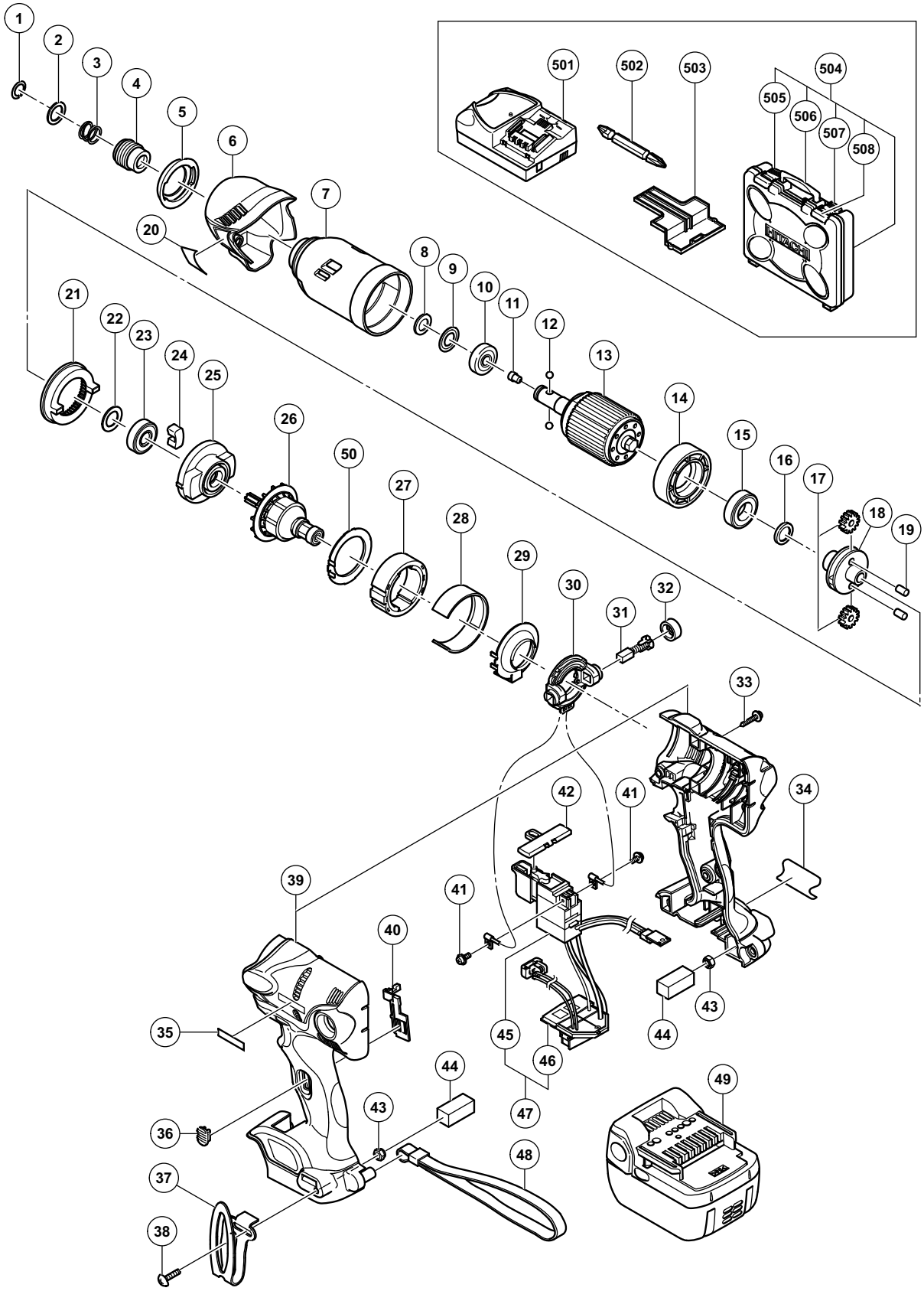
Hitachi Power Tools

LIST NO. H846

ELECTRIC TOOL PARTS LIST

■ CORDLESS OIL PULSE DRIVER 2010･10･6

Model WP 14DSL (E2)



ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
1	995-933	RETAINING RING	1		
2	307-899	RETAINER	1		
3	995-931	GUIDE SPRING	1		
4	307-782	GUIDE SLEEVE (A)	1		
5	322-239	FRONT CAP	1		
6	331-958	FRONT COVER	1		
7	331-833	HAMMER CASE	1		
8	322-218	FELT PACKING	1		
9	322-219	PACKING WASHER	1		
10	322-220	BALL BEARING 6801VVCMSRL	1		
11	996-184	BIT PIECE	1		
12	959-148	STEEL BALL D3.175 (10 PCS.)	2		
13	331-835	PULSE UNIT	1		
14	322-217	BEARING COVER	1		
15	690-2VV	BALL BEARING 6902VVCMPS2L	1		
16	313-058	WASHER	1		
17	326-295	IDLE GEAR SET (2 PCS.)	2		
18	322-221	GEAR HOLDER	1		
19	319-914	NEEDLE ROLLER	2		
20		HITACHI LABEL	1		
21	326-787	RING GEAR(E)	1		
22	319-911	WASHER (E)	1		
23	323-118	BALL BEARING 6901VV-N	1		
24	319-909	DAMPER	2		
25	326-786	INNER COVER(D)	1		
26	360-752	ARMATURE DC 14.4V	1		
27	322-744	MAGNET (D)	1		
28	324-828	YOKE (A)	1		
29	324-830	DUST GUARD FIN (C)	1		
30	321-662	BRUSH BLOCK	1		
31	999-054	CARBON BRUSH 5 X 6 X 11.5 (1 PAIR)	2		
32	319-918	BRUSH CAP	2		
33	301-653	TAPPING SCREW (W/FLANGE) D4 X 20 (BLACK)	9		
34		NAME PLATE	1		
35		HITACHI PLATE	1		
36	326-783	LEVER(B)	1		
37	330-666	HOOK	1		
38	327-001	TRUSS HD. SCREW M4 (BLACK)	1		
39	329-710	HOUSING (A).(B)SET (GREEN)	1		
40	326-782	LEVER(C)	1		
41	994-532	MACHINE SCREW (W/SP. WASHER) M3 X 5	2		
42	321-661	PUSHING BUTTON (A)	1		
43	327-002	LOCK NUT M4 (BLACK)	2		
44	327-004	PACKING	2		
45	326-784	DC-SPEED CONTROL SWITCH	1		
46	329-708	CONTROLLER	1		
47	329-707	SWITCH ASS'Y	1		
48	306-952	STRAP (BLACK)	1		
49	330-068	BATTERY BSL 1830 (EUROPE, AUS, NZL)	2		
50	323-327	SIDE YOKE	1		

STANDARD ACCESSORIES

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
501		CHARGER (MODEL UC18YRSL)	1		
502	983-006	+ DRIVER BIT NO.2 65L	1		
503	329-897	BATTERY COVER	1		
504	329-440	CASE ASS'Y	1	INCLUD.505-508	
505	324-096	KNOB (L) DARK GRAY	1		
506	324-090	HANDLE (DARK GRAY)	1		
507	324-099	KNOB (R) DARK GRAY	1		
508	324-093	LATCH (DARK GRAY)	2		

OPTIONAL ACCESSORIES

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	
601	992-671	+ DRIVER BIT (B) NO.2 50L	1		
602	992-672	+ DRIVER BIT (B) NO.3 50L	1		
603	321-823	DRILL CHUCK AND ADAPTER SET	1		

ITEM NO.	CODE NO.	DESCRIPTION	NO. USED	REMARKS	